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ADMISSION TO PHD STUDIES FOR THE YEAR 2021

DOCTORAL RESEARCH TOPIC:

Influence of thermodynamically unstable structures on the reliability of steels in power plants under long-term thermal exposure

RESEARCH FIELD:

Energetics and Power Engineering (T 006)

BRIEF DESCRIPTION OF RESEARCH TOPIC:

Analysis of the thermal aging processes of high temperature resistant steels in thermal and nuclear power plants, oil refineries and chemical industries plants is one of the elements of the system reliability assessment. Therefore, the studies of changes in properties of these steels are important in order to assess their condition and to determine the reliable residual lifetime. Traditional methods for predicting steel properties using the results of mechanical tests (Larson-Miller, Mendelssohn-Roberts-Manson, Manson-Haferd, MC, Orr-Sherbi-Dorn, etc.) prevail in the research works of Lithuanian and foreign scientists in recent years. The methodology of this work is based not only on the traditional mechanical methods but also on the methods of microstructural research. One of the main aspects of novelty is to evaluate the influence of changes in the microstructure of aging steel on its properties. The results of the tests are analyzed and the value of the steel structural parameter, which is characteristic for one or other operating conditions, when the limit of steel operational service life is achieved, is selected.
The aim of the work is to develop a methodology for evaluating the safe operation of heat resistant steels, used in the power industry, based on the evaluation of changes in the microstructure of thermodynamically unstable phases of steels and mechanical characteristics after high-temperature aging. The results of the research will provide a new knowledge about the processes occurring in high temperature resistant steels during aging and will be relevant in the assessment of the safe and reliable operation of power plants.

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